(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
28 December 2000 (28.12.2000)

PCT

(10) International Publication Number
WO 00/79374 A1

(51) International Patent Classification[7]: G06F 3/033

(21) International Application Number: PCT/CA00/00596

(22) International Filing Date: 19 May 2000 (19.05.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
09/337,536 22 June 1999 (22.06.1999) US

(71) Applicant: **NORTEL NETWORKS LIMITED** [CA/CA]; World Trade Center of Montreal, 8th Floor, 380 St. Antoine Street West, Montreal, Quebec H2Y 3YF (CA).

(72) Inventors: **ROCHFORD, Suzanne, L.**; 96 rue de l'Aviron, Hull, Quebec J8Z 3G9 (CA). **WILLE, Allan**; Suite 201, 188 Waverly Street, Ottawa, Ontario K2P 0V6 (CA).

(74) Agents: **BRETT, R., Allan** et al.; Smart & Biggar, 900-55 Metcalfe Street, Suite 900, P.O. Box 2999, Station D, Ottawa, Ontario K1P 5Y6 (CA).

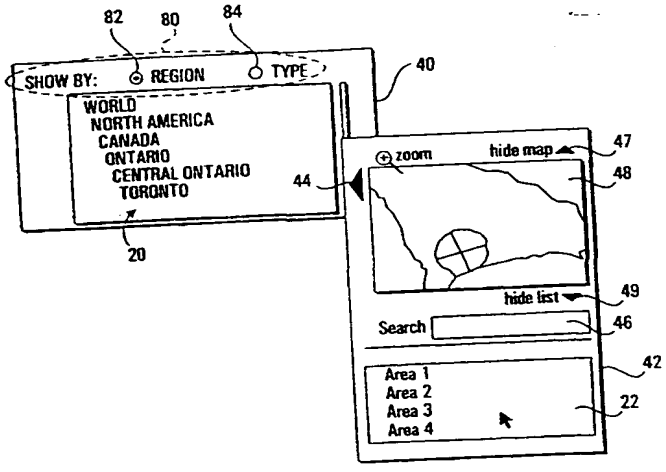
(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:
— *With international search report.*
— *Before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments.*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: METHOD AND APPARATUS FOR DISPLAYING AND NAVIGATING CONTAINMENT HIERARCHIES



(57) Abstract: A method for use in a computer system for displaying a containment group such as file folder hierarchy. The method displays a direct containment hierarchy for the selected containment group or file folder, and also displays a list of contents of the selected containment group or file folder. A direct containment hierarchy displays only file folders or containment groups which directly or indirectly contain the selected containment group or file folder. In this manner a large number of file folders or containment groups which do not ultimately contain the selected file folder or containment group are not displayed, thereby simplifying the display, and ensuring that the entire direct containment hierarchy can be shown on a single display screen without the need for scrolling in order to obtain or ascertain the context of the given file folder or containment group.

WO 00/79374 A1

METHOD AND APPARATUS FOR DISPLAYING AND NAVIGATING CONTAINMENT HIERARCHIES

Field of the Invention

The invention relates to a method and apparatus for displaying and navigating containment hierarchies such as file folder containment hierarchies, and more particularly to a system and method facilitating on-screen navigation through a file folder hierarchy which has a substantial containment level and a large file folder size.

Background of the Invention

Computers typically use directories or file folders to store files, thereby allowing files having some common characteristic to be stored together and accessed as a group. A top-level file folder may be considered as containing all the files on a given device, for example a hard disk or floppy drive. The top-level file folder then contains a containment hierarchy of file folders with each file folder containing file folders lower in the hierarchy, and/or files. A file folder which contains another file folder or file is referred to as a parent, while the file folders and/or files contained in a parent file folder are that file folder's children. Children files and file folders are each other's siblings. A file folder containing only files, and no file folders is a bottom-level file folder. The number of containments between a file in a bottom-level file folder and the top-level file folder is the containment depth for that file, and the number of files and file folders directly contained within a file folder is that file folder's size, also referred to as width or breadth.

Various graphical user interfaces have been adopted for navigating through the containment hierarchy of file folders, the most common being that used in MICROSOFT's

Windows* based software such as File Manager and Windows Explorer. In these products, when a file folder having a "+" indicator (indicating it contains at least one file folder) is selected, a complete list of the file folder's children file folders is added to a displayed hierarchy in a left display window, and any children files contained in the file folder are displayed in a right display window. Other rules come into play when a device is selected. When a file folder from the list of children file folders is selected, a complete list of that file folder's children file folders contained in the selected file folder is added to the displayed hierarchy in the left display window, and so on. Windows provides various mechanisms for hiding the details of a file folder and for controlling somewhat what is displayed in the left window and the right window. These approaches work very well when the containment hierarchy has a small depth and a small breadth, but are cumbersome and inconvenient to use when one or both of these two characteristics are not true. This is because the containment hierarchy in combination with a large breadth (file folder size) may result in potentially relevant portions of the display being scrolled out of view, such that a user loses the ability to directly ascertain the containment or context of what is being displayed. More particularly, if the file folder of interest is in a large group of file folders at the same level in the hierarchy and contained within a single higher level parent file folder, Windows provides no way to focus on the file folder of interest to the exclusion of the others in the parent file folder. Suppose for example, the file folder of interest is at the bottom of a list of one hundred file folders in a parent file folder, the hierarchy, or "context" of this parent file folder will scroll off the screen when a user moves down to the file folder of interest.

*Trademark

Another disadvantage of existing systems is that as the number of file folders opened increases, the display becomes cluttered making navigation to a new point in the hierarchy difficult. As a result the user is required to close up file folders when they want to navigate to new point.

It would be desirable to be able to navigate through a file folder containment hierarchy in a manner which allows the context of what is being observed to be continuously clear.

Summary of the Invention

It is an object of the invention to obviate or mitigate one or more of the above identified disadvantages.

According to a broad aspect, the invention provides a method for use in a computer system for displaying a containment hierarchy such as a file folder hierarchy. The method displays a direct containment hierarchy for a selected containment group or file folder, and also displays a list of contents of one of the containment groups or file folders in the direct containment hierarchy. A direct containment hierarchy displays only file folders or containment groups which directly or indirectly contain the selected containment group or file folder. In this manner a large number of file folders or containment groups which do not ultimately contain the selected file folder or containment group are not displayed, thereby simplifying the display, and ensuring that the entire direct containment hierarchy can be shown on a single display screen without the need for scrolling in order to obtain or ascertain the context of the given file folder or containment group.

Preferably, the list of contents of the selected file folder or containment group is searchable to allow a user to quickly focus in upon files or file folders having names satisfying search criterion entered by the user.

Preferably, a pictorial representation of the selected file folder's position with the direct containment hierarchy is provided. A skilled user can then select files or file folders by using the pictorial representation rather than the textual representation, this in some cases allowing a quicker selection process to be realized.

In other embodiments of the invention, a computer system, a graphical user interface, an operating system, and a computer readable medium are respectively provided each of which have been adapted to implement one or more of the above discussed methods.

Brief Description of the Drawings

Preferred embodiments of the invention will now be described with reference to the attached drawings in which:

Figure 1 is an example of a containment hierarchy;

Figure 2 is an example of how conventional products would display the hierarchy of a particular file in the example containment hierarchy of Figure 1;

Figure 3 is an example of a display of a file folder hierarchy of a particular file folder in the example containment hierarchy of Figure 2 according to an embodiment of the invention;

Figures 4A through 4E are a sequence of figures illustrating how the display of Figure 3 was arrived at;

Figure 5 is an example of a containment hierarchy according to an embodiment of the invention in which the list of contents is scrollable;

Figure 6 is an example of a containment hierarchy according to an embodiment of the invention in which a distinguishment has been made between various types of contents;

Figure 7 is an example of another way of manipulating the containment hierarchy according to an embodiment of the invention;

Figure 8 is an example of a containment hierarchy according to embodiments of the invention in which a pictorial representation is used to allow control over a list of contents; and

Figure 9 is an example of a computer system for implementing methods provided by the invention.

Detailed Description of the Preferred Embodiments

An example of a computer system by which embodiments of the invention may be provided or implemented is depicted in block diagram form in Figure 9. A processing platform 10 such as a personal computer is shown connected to storage devices 12 (two shown), a display 14, a keyboard 16 and a mouse 18. The processing platform 10 has an operating system which is aware of or can ascertain the files stored on the storage devices 12 and knows their hierarchical containment.

Now, a few definitions will be given.

FILE FOLDER: any mechanism for providing logical or physical containment of files;

FILE: a logical or physical entity which does not have any containment;

CONTAINMENT DEPTH: the term "containment depth" will be used to refer to a numeric value which identifies inclusively the number of containments between a file folder and a top-level file folder. Thus, a file folder with a containment depth of "3" with respect to the top-level file folder for example, is contained in another file folder which is contained in the top-level file folder.

PARENT: a file folder which contains other file folders and/or files;

CHILD,CHILDREN: files or file folders contained in a parent file folder;

SIBLINGS: the name of files or file folders contained in the same parent, as they relate to each other.

A method displaying a file folder hierarchy according to an embodiment of the invention will be described by way of example for a particular arrangement of files and file folders which is illustrated graphically in Figure 1. Indentation in Figure 1 means containment. Thus, for example, "WORLD" contains "AFRICA", "ASIA", "AUSTRALIA", "EUROPE", "NORTH AMERICA" and "SOUTH AMERICA". In Figure 1, file folders are indicated in bold, and regular files are not indicated in bold. Let us assume that we are interested in the contents of the file folder "TORONTO". For the sake of comparison, an example of the most concise hierarchy which might be displayed in conventional "Windows" based applications is illustrated in Figure 2. The first thing one notices is that Figure 2 includes the display of 34 file folders and files. Disadvantageously, there is no way to hide details of file folders contained in the same file folder as a file folder which contains directly or indirectly the file folder of interest. For example, although we are interested in "TORONTO", the display always includes file folders contained

in "CENTRAL ONTARIO", in this case "BARRY", "HAMILTON", "MILTON", "OAKVILLE", "OSHAWA", and "SCARBOROUGH". This results in the lengthy display of Figure 2, which when presented on a display screen, would likely result in the top portion of the hierarchy scrolling off the screen.

Referring now to Figure 3, according to an embodiment of the invention, a computer system (for example the system of Figure 9) is adapted to implement a method which displays the hierarchy for a selected file folder, (for example file folder "ONTARIO" in Figure 1), by displaying a direct containment hierarchy 20 for that file folder, and by displaying a list of contents 22 of the selected file folder. In the illustrated example, the direct containment hierarchy 20 consists of the sequence of file folders "WORLD", "NORTH AMERICA", "CANADA", "ONTARIO", "CENTRAL ONTARIO", and "TORONTO". A direct containment hierarchy 20 consists of some top-level file folder, in this case "WORLD", and then a sequence of child file folders, one at each containment depth down to and including a lowest-selected file folder, in this case "TORONTO". As in this example, the sequence might end at a lowest-selected file folder which is a bottom-level file folder, but this need not be the case. The direct containment hierarchy 20 only includes the file folders which lead directly to the selected file folder. Thus, for the illustrated example, the child file folders contained by "WORLD" in addition to "NORTH AMERICA" are not displayed (as they are in prior art example of Figure 2), the child file folders contained by "NORTH AMERICA" in addition to "CANADA" are not displayed (as they are in the prior art example of Figure 2), the child file folders contained by "CANADA" other than "ONTARIO" are not displayed (as they are in the prior art example of Figure 2), the child file folders contained by "ONTARIO" other than "CENTRAL ONTARIO" are not displayed (as they are in the prior art example of Figure 2), and the child file folders contained by "CENTRAL ONTARIO" other

than "TORONTO" are not displayed (as they are in the prior art example of Figure 2). The result is a concise display of the hierarchy of the file folder "TORONTO" which can be immediately discerned directly from the display without the need to perform any scrolling.

To move to the next level in the hierarchy, a file folder from the list of contents 22 can be selected. A sequence of selections which results in the display of Figure 3 is displayed in Figures 4A - 4E. In Figure 4A, the list of child file folders 30 contained in "WORLD" is displayed. Selection of the file folder "NORTH AMERICA" results in the display of Figure 4B which is a list of child file folders 32 contained in "NORTH AMERICA". The selection of "CANADA" in Figure 4B results in the display of Figure 4C which is a list of child file folders 34 contained in "CANADA". The selection of "ONTARIO" in Figure 4C results in the display of Figure 4D which is a list of child file folders 36 contained in "ONTARIO". The selection of "CENTRAL ONTARIO" in Figure 4D results in the display of Figure 4E which is a list of child file folders 38 contained in "CENTRAL ONTARIO". The selection of "TORONTO" in Figure 4E results in the display of previously described Figure 3 which includes a list of files contained in "TORONTO". In each case, upon selection of a file folder in the list of contents previously displayed, the selected file folder is added to the display of the direct containment hierarchy, (or alternatively the direct containment hierarchy is redrawn to include the selected file folder) and the contents of the newly selected child file folder are displayed in place of the list of contents previously displayed for the previously selected file folder.

In a preferred embodiment, as in the illustrated examples, the direct containment hierarchy is displayed on a first window 40, and the list of contents is displayed in a second window 42. The two windows 40,42 are preferably

displayed adjacent to each other, or with the second window partially overlapping the first. The display of the second window 42 has an arrow 44 pointing to the file folder in the direct containment hierarchy whose contents are listed in the list of contents 22.

In a preferred embodiment, the arrow 44 can be dragged or otherwise controlled with a user input device, for example a mouse, such that it points to any level in the displayed direct containment hierarchy 20. When such is done, the second window 42 moves up with the arrow 44, and the list of contents 22 is updated to show the contents of the file folder pointed to by the arrow at a given time. For example, in Figure 7 after navigating down to the "TORONTO" file folder arrow 44 has been dragged up to point at "CANADA". The remainder of the direct containment hierarchy 20 below "CANADA" is still displayed. Should a user select one of the file folders in the list of contents 32, then the direct containment hierarchy 20 would be updated by adding this new entry below "CANADA", and by deleting the remainder of the direct containment hierarchy from the display. While an arrow 44 is shown as the mechanism for jumping up to a previously selected level in the direct containment hierarchy, it is to be understood that other mechanisms for achieving this may alternatively be employed. For example, by clicking within the direct containment hierarchy 20 with a mouse on the level of interest, by dragging the entire window 42, or any other suitable mechanism.

Preferably, upon temporary indication of a direct containment group in the direct containment hierarchy, for example by mousing over the direct containment group or by using the above described arrow mechanism, the contents of the temporarily selected containment group are temporarily displayed without updating the direct containment hierarchy. Upon actual selection of a direct containment group in the

direct containment hierarchy, for example by double clicking on the direct containment group, the contents of the selected containment group are displayed and the direct containment hierarchy is updated such that the selected direct containment group is now the lowest-level containment group.

A search window 46 may be provided which allows a user to enter a textual search criterion. The system in response to such an entry performs a search of the file names in the currently displayed list of contents and displays any matching results. Any searching technique may be employed to this end including any one of many existing well known techniques.

Preferably, a pictorial representation of the contents of the selected file folder is provided. Referring again to Figure 3, in this example, a pictorial representation 48 consisting of a map corresponding to the name of the selected file folder is provided as part of the second window 42. Thus, in Figure 4A, a map 50 of the world is shown. In Figure 4B, a map 52 of North America is shown. In Figure 4C, a map 54 of Canada is shown. In Figure 4D, a map 56 of Ontario is shown. In Figure 4E, a map 58 of Central Ontario is shown, and in Figure 3, a map 48 of Toronto is shown. This is particularly appropriate for the example at hand in which all of the file folders have names which have geographical connotations. However, it may also be suitable to perform such pictorial representations for other containment hierarchies. Preferably, the pictorial representation is done in a manner which allows the selection of a file or file folder from the list of contents by clicking on the pictorial representation. For example, Canada is displayed in Figure 4C, and a user knowing where Ontario is could click directly on Ontario to select the file folder "ONTARIO". Preferably, it is user selectable to hide the pictorial representation and/or to hide the list of contents. In the illustrated example of Figure 3,

a "hide map" screen switch 47 is provided which when selected redraws the display without the map and shows a screen switch "show map" in place of the "hide map" screen switch. Similarly, a "hide list" screen switch 49 may be provided.

In a preferred embodiment, when a pictorial representation of the selected file folder is displayed as part of the second window, different pictorial elements in the pictorial representation will represent the list of contents 32. For example, in Figure 8, the list of contents consists of a list of provinces, and the pictorial representation 48 is a map of Canada illustrating the different provinces. Preferably, by "mousing over" the pictorial representation, i.e. by moving a mouse over the pictorial representation but not clicking on anything, the name of the element currently being displayed is brought to the top of the list of contents 34. In the example of Figure 8, as indicated by mouse pointer 100 a user has moused over the pictorial element for Quebec, namely the portion of the map of Canada 48 representing Quebec, with the result that Quebec has been brought to the top of the list of contents 34. Preferably, when a particular pictorial element has been moused over, a halo or other highlighting effect is added to the display to make it clear to a user which pictorial element is being moused over at a given time. Preferably, the listing which is brought to the top of the list of contents 34 is highlighted or otherwise distinguished from the remainder of the list.

In a preferred embodiment, the invention provides for a choice between different hierarchies for the same set of entities. For example, in a hierarchy of file folders and files, the only real physical entities are the files, while the file folders are just logical groupings. While these logical groupings may make sense for one user, they may not make sense for another user. According to the invention, a method is provided which permits a user to select between different

containment hierarchies. For this embodiment, collectively somewhere in either the computer system, software, or storage devices, the various different hierarchies must be stored. Preferably, a screen switch is provided on the display which allows a user to switch between the different available containment hierarchies. Preferably, an option exists to switch between the display of different hierarchies for a given file entity. In the illustrated embodiment of Figure 3, an area 80 of the display contains two screen switches 82,84 which are individually selectable with a mouse for example. Screen switch 82 selects that a "Region" containment hierarchy be used in displaying the direct containment hierarchy, and this has been selected for the examples. Screen switch 84 selects that a "Type" containment hierarchy be used in displaying the direct containment hierarchy.

In a preferred embodiment, the list of contents is displayed scrollably. An example of this is shown in Figure 5 which is a version of Figure 4E which illustrates a list of contents 38 displayed with scroll bars 60. Other methods of providing scrollability can be provided, such as configuring the arrow keys to move up and down through the list of contents for example.

In another preferred embodiment, the list of contents is displayed in a manner which distinguishes between various types of contents, for example to distinguish between file folders and files. An example of this is shown in Figure 6 which is a version of Figure 4E. The file folders in the list of contents 38 of Figure 4E are indicated as such by including a small pictorial file folder 70 beside them. Any suitable icons or indicators could be used to identify other types of entities.

The above described embodiments have focused mainly on a method in a computer system for displaying a selected file folder. In addition, an embodiment of the invention also provides for a software program containing software which when run will implement one or more of the above discussed methods, stored on a computer readable medium. Another embodiment of the invention provides a computer system per se adapted to implement one or more of the above discussed methods. Furthermore, in another embodiment, a graphical user interface is provided which has been adapted to implement one or more of the above discussed methods. Furthermore, in another embodiment, an operating system is provided which has been adapted to implement one or more of the above discussed methods, the operating system preferably being a Windows-based operating system.

The above described embodiments have focussed on file folders and files. More generally the invention can be applied to any containment hierarchy having any type of containment groups and any type of containment entity. In this case, an embodiment of the invention displays a direct containment hierarchy of containment groups and a list of contents for the lowest-level containment group. For example, a containment hierarchy could be used to represent components in a network. In this case, each containment group would identify some type of grouping of other containment groups or of network elements per se. Other examples include way-finding tools, telephone directories and Internet site navigators to name a few.

Where the illustrated examples have featured the use of two windows, it is to be understood that more generally two areas of any suitable definition may be used.

Numerous modifications and variations of the present invention are possible in light of the above teachings. It is therefore to be understood that within the scope of the appended claims, the invention may be practised otherwise than as specifically described herein.

WE CLAIM:

1. A method in a computer system, comprising:

displaying a direct containment hierarchy having at least two hierarchical containment groups one of which is a lowest level containment group; and

displaying a list of contents of the one of said containment groups.

2. A method according to claim 1 wherein each containment group is a file folder.

3. A method according to claim 1 wherein said displaying a list of contents is done scrollably.

4. A method according to claim 2 wherein said direct containment hierarchy is displayed in a first area and said list of contents is displayed in a second area.

5. A method according to claim 4 wherein said second area is displayed adjacent to or partially overlapping with the first area.

6. A method according to claim 2 comprising:

upon selection of a child file folder in the list of contents of the lowest-level folder, in place of the previous direct containment hierarchy displaying a new direct containment hierarchy which includes the newly selected child file folder;

displaying the contents of the newly selected child file folder in place of the list of contents.

7. A method according to claim 2 further comprising:

upon entry of a search criterion, searching the list of contents for any listings which match the search criterion and displaying any such listings.

8. A method according to claim 1 further comprising:

displaying a pictorial representation of the list of contents.

9. A method according to claim 8 wherein the pictorial representation is a map.

10. A method according to claim 9 wherein said map is a geographical map.

11. A method according to claim 8 wherein said pictorial representation includes a pictorial element for each listing in said list of contents.

12. A method according to claim 11 wherein upon a user identifying a particular pictorial element in the display, the method alters the display of that particular pictorial element to highlight the fact that it has been indicated, and a corresponding listing in the list of contents is moved to the top of the list of contents.

13. A method according to claim 1 further comprising displaying said list of contents in a manner which distinguishes between various types of contents.

14. A method according to claim 13 wherein said various types of contents comprise file folders and files.

15. A method according to claim 2 wherein displaying the direct containment hierarchy comprises displaying a list inclusively containing only file folders which directly or indirectly contain the lowest-level file folder.

16. A method according to claim 13 wherein displaying the direct containment hierarchy comprises displaying a sequence of nth file folders, where n = 1,...,K, where K is the containment depth of the lowest-level file folder, where for any n the nth file folder is a file folder which directly contains the (n-1)th file folder.

17. A method according to claim 1 wherein said one of said containment groups is user selectable.

18. An apparatus adapted to display containment hierarchies, comprising:

means for displaying a first direct containment hierarchy based on a first containment hierarchy;

means for displaying a list of contents of a containment group in said first direct containment hierarchy;

means for receiving an input indicating to change to a second containment hierarchy;

means for displaying a second direct containment hierarchy based on the second containment hierarchy;

means for displaying a list of contents of a containment group in said second direct containment hierarchy.

19. An apparatus according to claim 18 further comprising:

means for setting a lowest-level containment group in said second direct containment hierarchy to contain a selected containment entity in a lowest-level containment group in said

first direct containment hierarchy.

20. A computer system adapted to implement the method of any one of claims 1 to 17.

21. A graphical user interface adapted to implement the method of any one of claims 1 to 17.

22. An operating system adapted to implement the method of any one of claims 1 to 17.

23. A Windows-based operating system adapted to implement the method of any one of claims 1 to 17.

24. A computer readable medium having software stored thereon for instructing a computer to implement a method according to any one of claims 1 to 17.

25. A method according to claim 11 further comprising:

upon selection of a particular pictorial element, in place of the previous direct containment hierarchy displaying a new direct containment hierarchy which includes the child file folder corresponding with the particular pictorial element;

displaying the contents of the child file folder corresponding with the particular pictorial element in place of the list of contents.

26. A method according to claim 1 further comprising:

upon temporary selection of a direct containment group in the direct containment hierarchy, temporarily displaying the contents of the temporarily selected containment group without updating the direct containment hierarchy.

27. A method according to claim 1 further comprising:

upon selection of a selected containment group in the direct containment hierarchy, modifying the direct containment hierarchy to extend down to the selected containment group; and

displaying the contents of the selected containment group in place of the list of contents.

- WORLD
  - AFRICA
    - SOUTH AFRICA
  - ASIA
  - AUSTRALIA
    - JAPAN
    - CHINA
  - EUROPE
    - FRANCE
    - UNITED KINGDOM
    - GERMANY
  - NORTH AMERICA
    - CANADA
      - NEWFOUNDLAND
      - NEW BRUNSWICK
      - NOVA SCOTIA
      - PRINCE EDWARD ISLAND
      - QUEBEC
      - ONTARIO
        - CENTRAL ONTARIO
          - BARRY
            - AREA1
            - AREA2
            - AREA3
          - HAMILTON
            - AREA1
            - AREA2
            - AREA3
          - MILTON
            - AREA1

FIG. 1

AREA2
AREA3
OAKVILLE
AREA1
AREA2
AREA3
OSHAWA
SCARBOROUGH
TORONTO
AREA1
AREA2
AREA3
AREA4
EASTERN ONTARIO
NORTHERN ONTARIO
SOUTHERN ONTARIO
MANITOBA
SASKATCHEWAN
ALBERTA
BRITISH COLUMBIA
UNITED STATES
MEXICO
SOUTH AMERICA

FIG. 1 (CONTINUED)

- WORLD
  - AFRICA
  - ASIA
  - AUSTRALIA
  - EUROPE
  - NORTH AMERICA
    - CANADA
      - NEW FOUNDLAND
      - NEW BRUNSWICK
      - NOVA SCOTIA
      - PRINCE EDWARD ISLAND
      - QUEBEC
      - ONTARIO
        - CENTRAL ONTARIO
          - BARRY
          - HAMILTON
          - MILTON
          - OAKVILLE
          - OSHAWA
          - SCARBOROUGH
          - TORONTO
            - AREA1
            - AREA2
            - AREA3
            - AREA4
        - EASTERN ONTARIO
        - NORTHERN ONTARIO
        - SOUTHERN ONTARIO
      - MANITOBA
      - SASKATCHEWAN
      - ALBERTA

FIG. 2

BRITISH COLUMBIA
UNITED STATES
MEXICO
SOUTH AMERICA

FIG. 2 (CONTINUED)

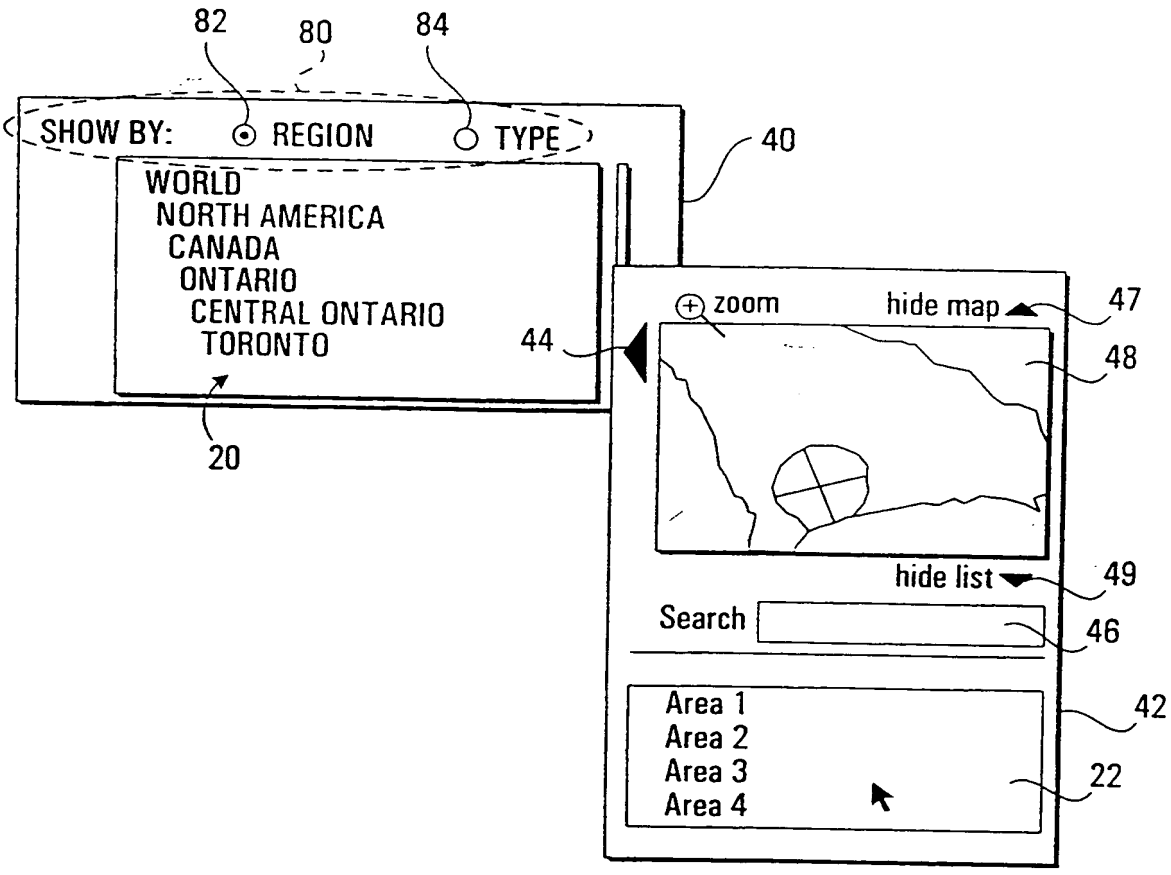


FIG. 3

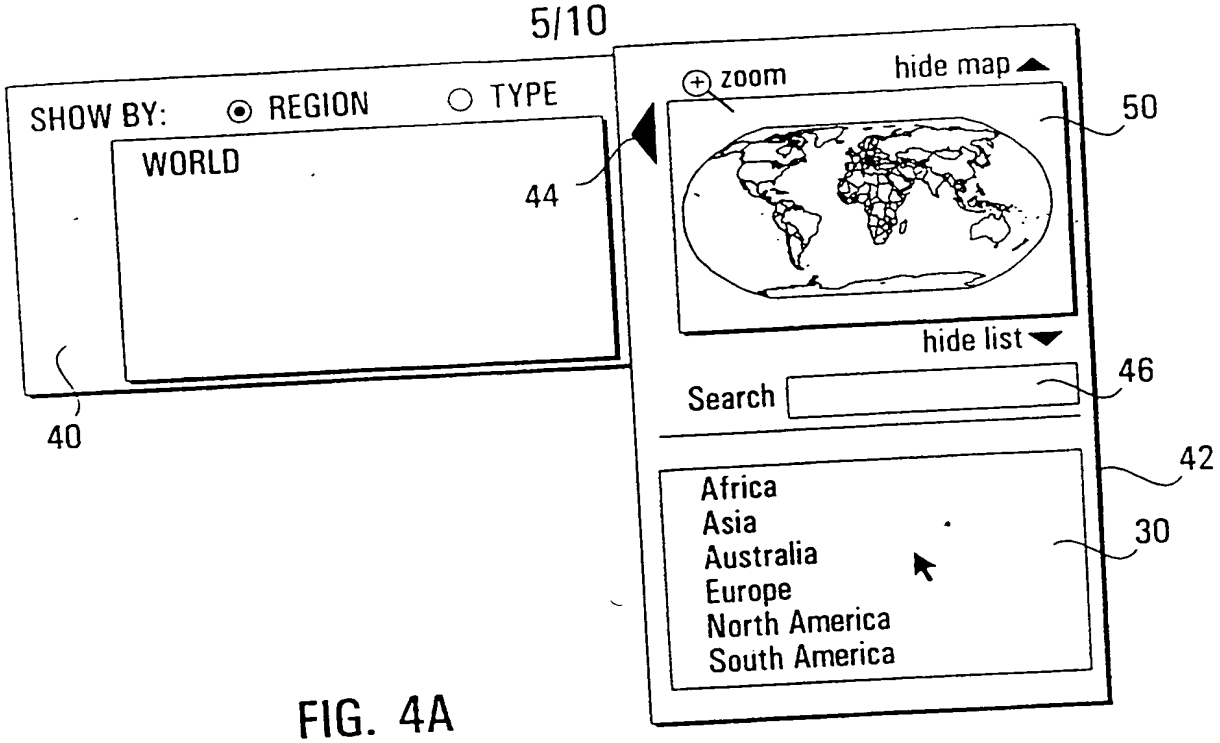

SHOW BY:
REGION
TYPE
WORLD
44
40
zoom
hide map
50
hide list
Search
46
42
Africa
Asia
Australia
Europe
North America
South America
30

FIG. 4A

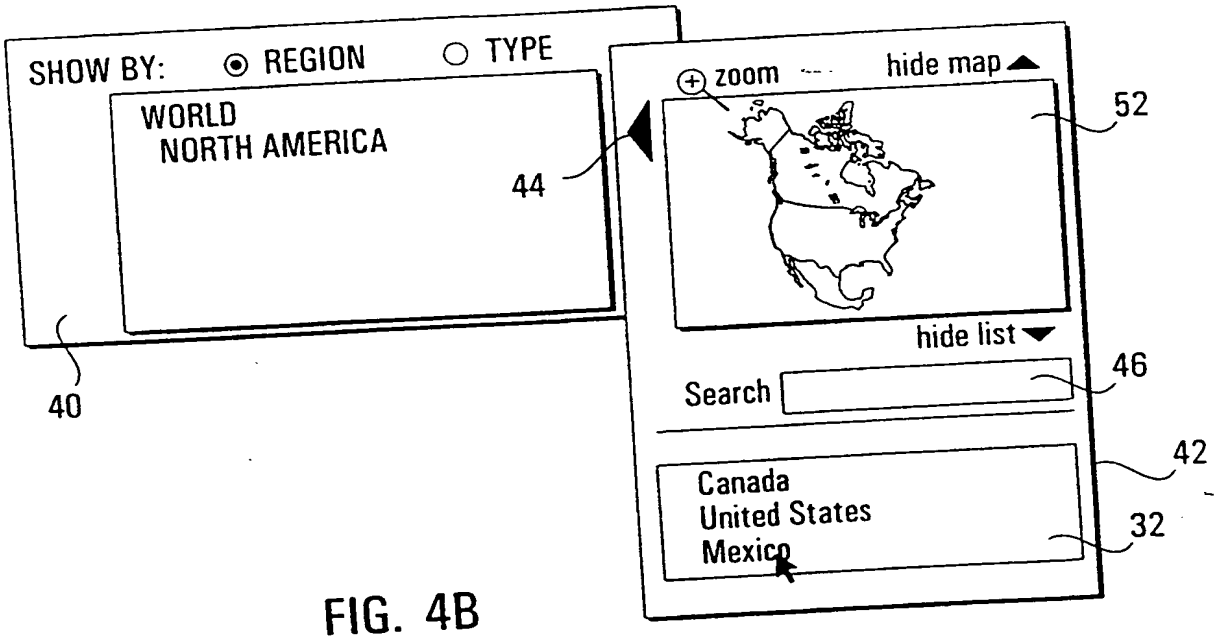

SHOW BY:
REGION
TYPE
WORLD
NORTH AMERICA
44
40
zoom
hide map
52
hide list
Search
46
42
Canada
United States
Mexico
32

FIG. 4B

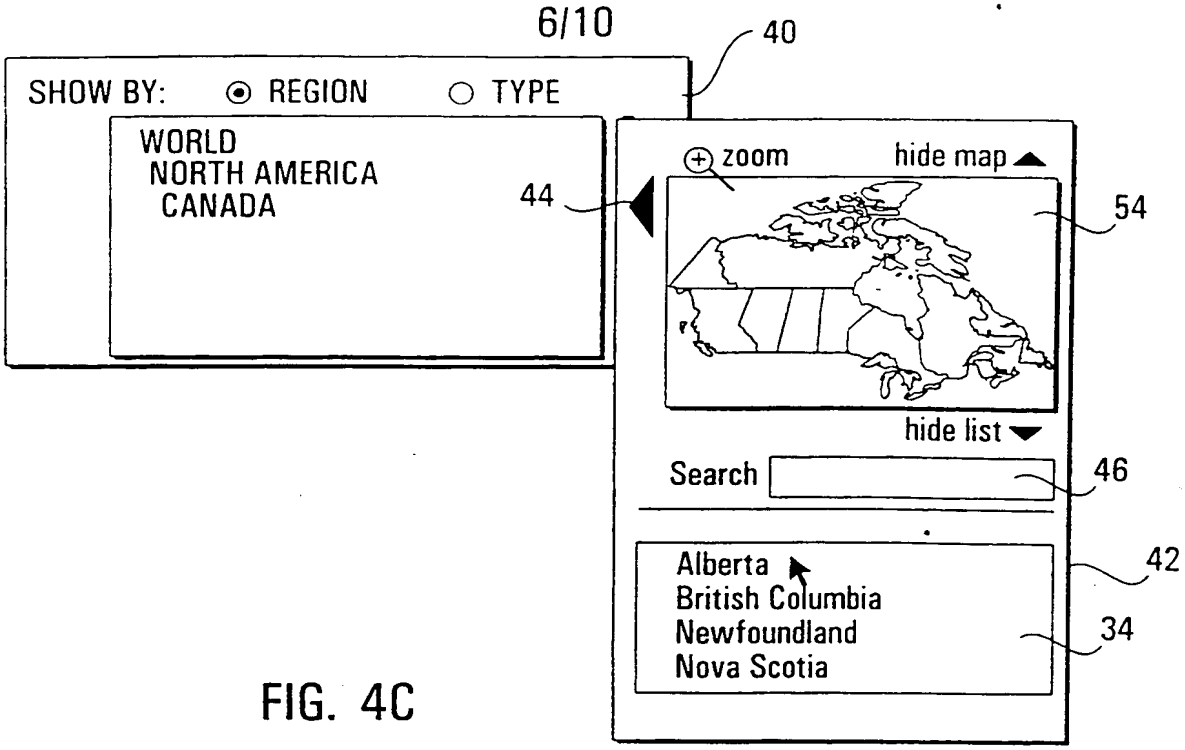

SHOW BY: REGION TYPE
WORLD
NORTH AMERICA
CANADA
44
40
zoom
hide map
54
hide list
Search
46
Alberta
British Columbia
Newfoundland
Nova Scotia
42
34

FIG. 4C

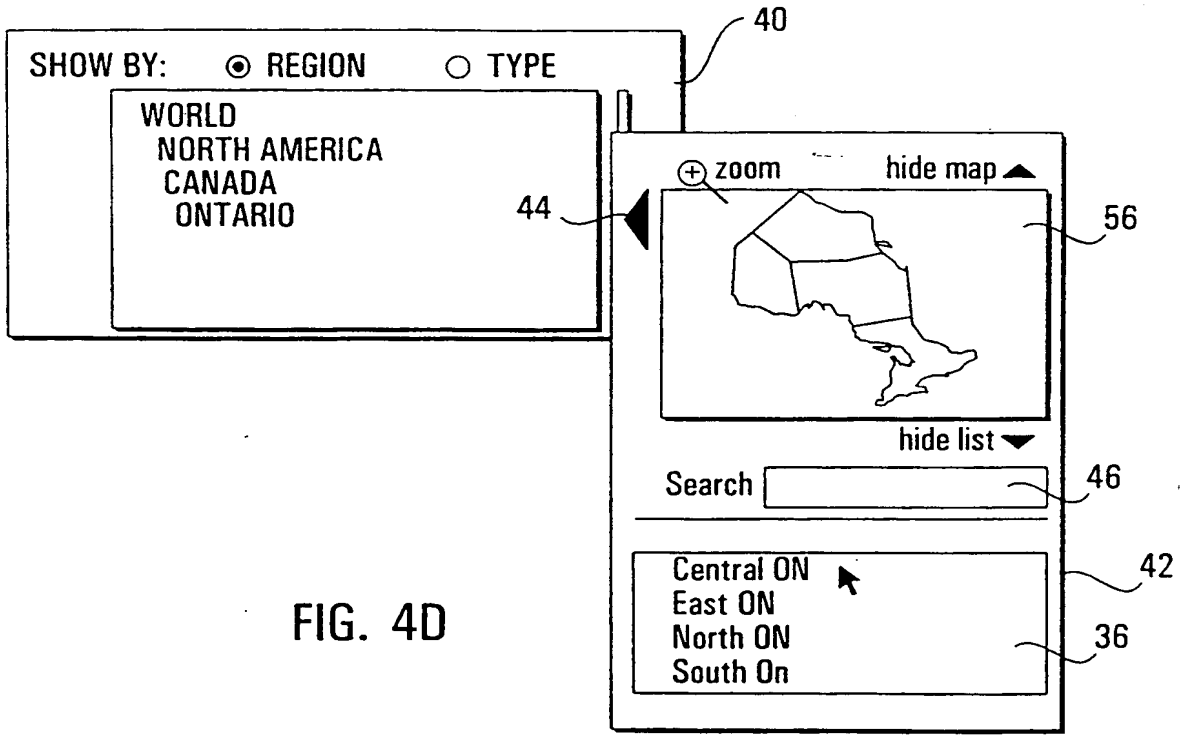

SHOW BY: REGION TYPE
WORLD
NORTH AMERICA
CANADA
ONTARIO
44
40
zoom
hide map
56
hide list
Search
46
Central ON
East ON
North ON
South On
42
36

FIG. 4D

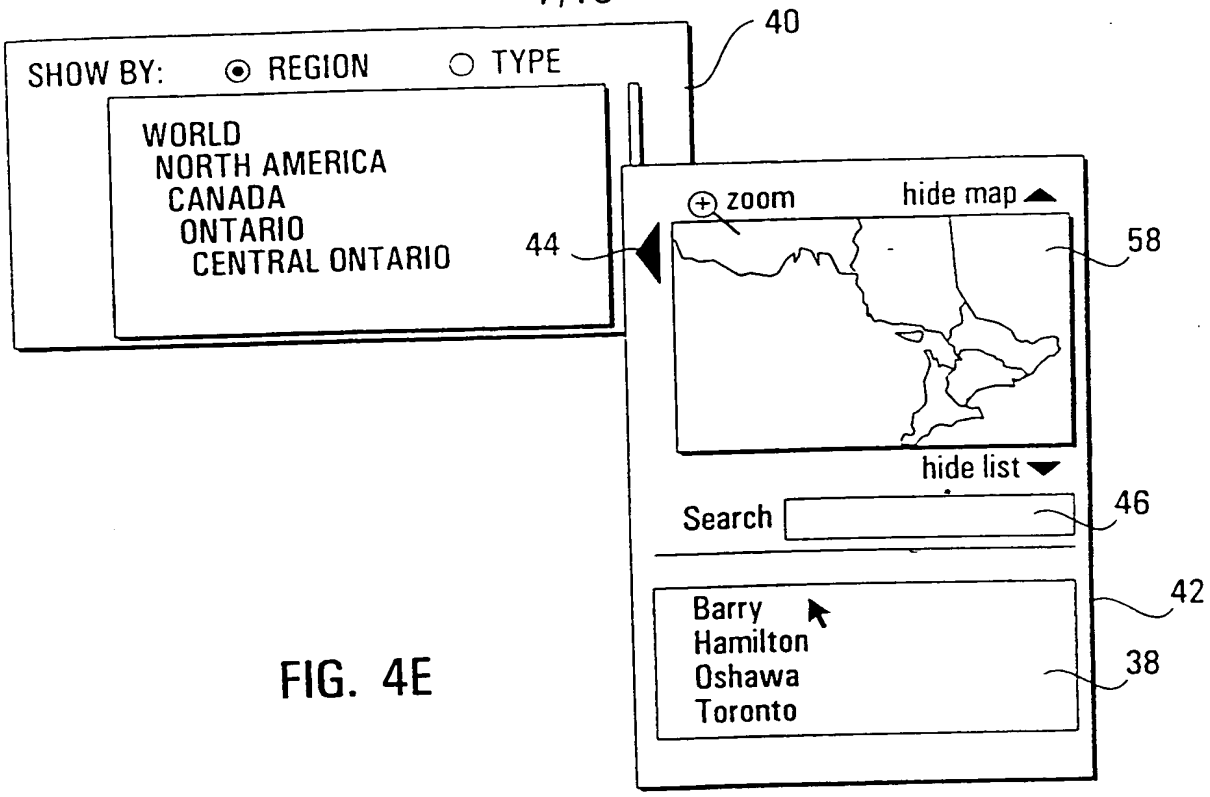

SHOW BY: REGION TYPE
40
WORLD
NORTH AMERICA
CANADA
ONTARIO
CENTRAL ONTARIO
44
zoom
hide map
58
hide list
Search
46
42
Barry
Hamilton
Oshawa
Toronto
38

FIG. 4E

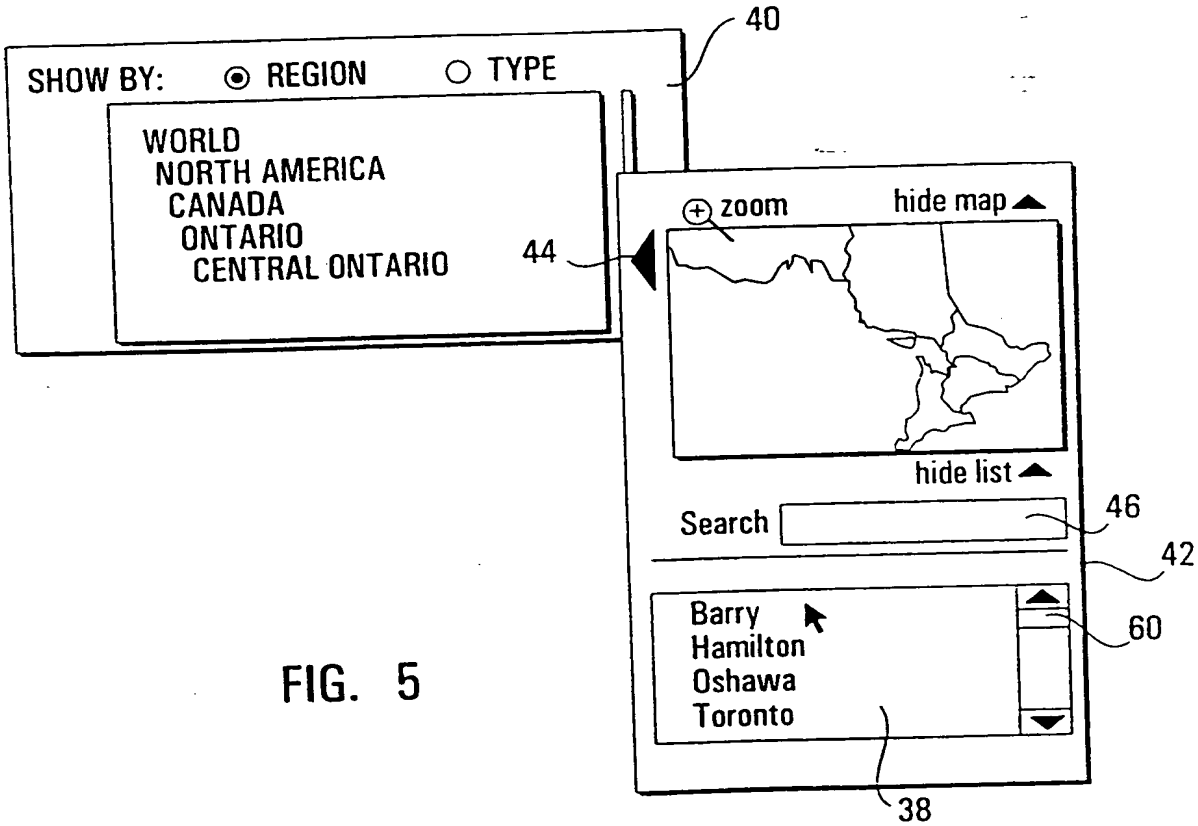

SHOW BY: REGION TYPE
40
WORLD
NORTH AMERICA
CANADA
ONTARIO
CENTRAL ONTARIO
44
zoom
hide map
hide list
Search
46
42
Barry
Hamilton
Oshawa
Toronto
60
38

FIG. 5

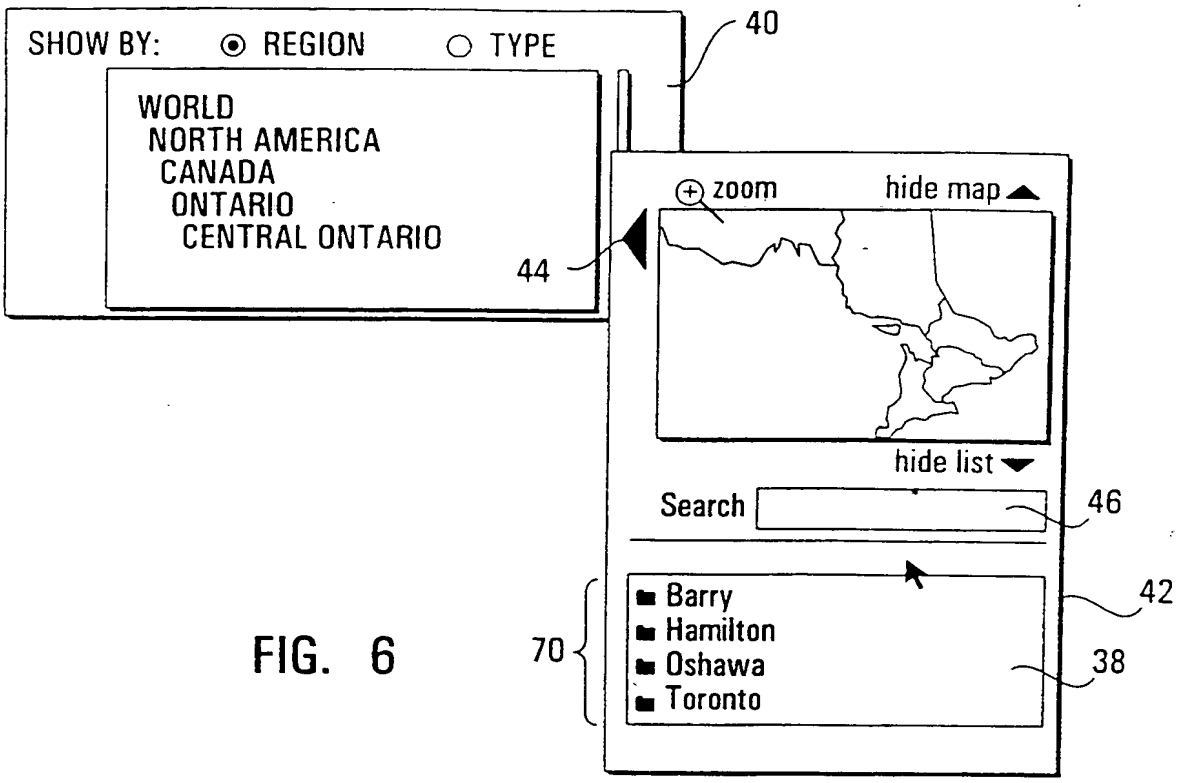

SHOW BY: REGION TYPE
40
WORLD
NORTH AMERICA
CANADA
ONTARIO
CENTRAL ONTARIO
44
zoom
hide map
hide list
Search
46
Barry
Hamilton
Oshawa
Toronto
70
42
38

FIG. 6

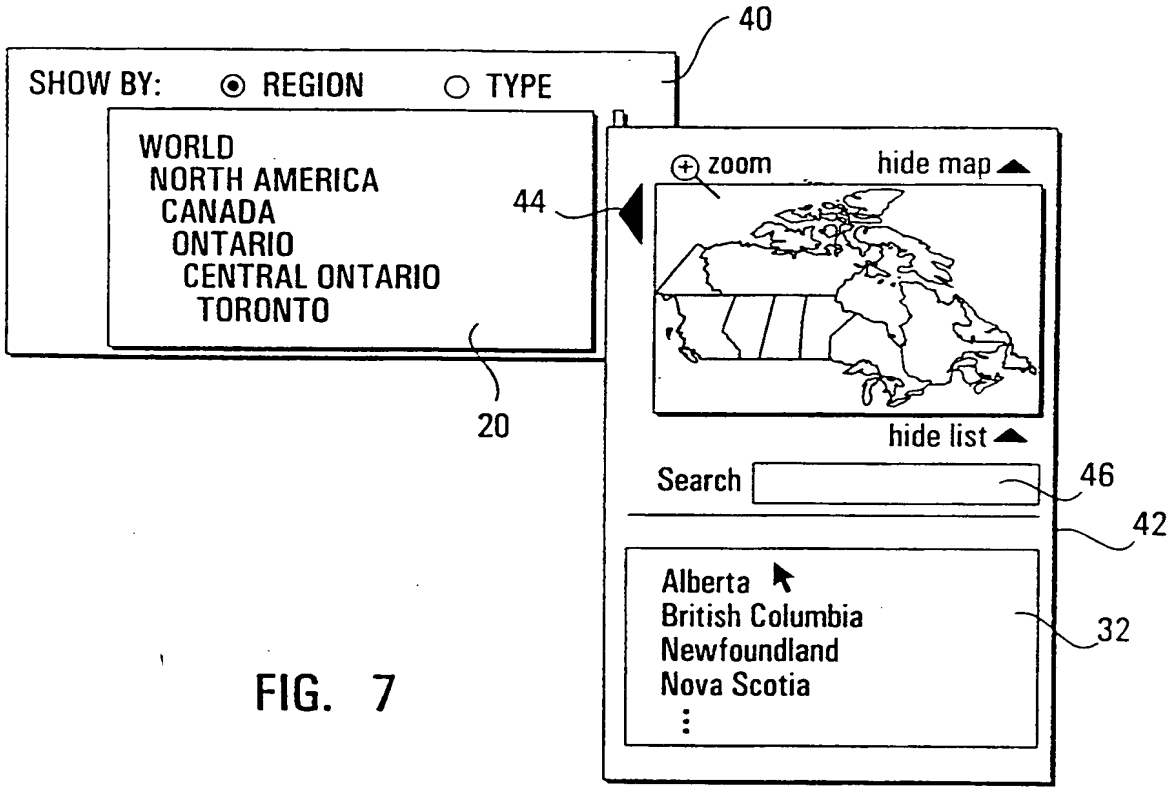

SHOW BY: REGION TYPE
40
WORLD
NORTH AMERICA
CANADA
ONTARIO
CENTRAL ONTARIO
TORONTO
44
20
zoom
hide map
hide list
Search
46
42
Alberta
British Columbia
Newfoundland
Nova Scotia
32

FIG. 7

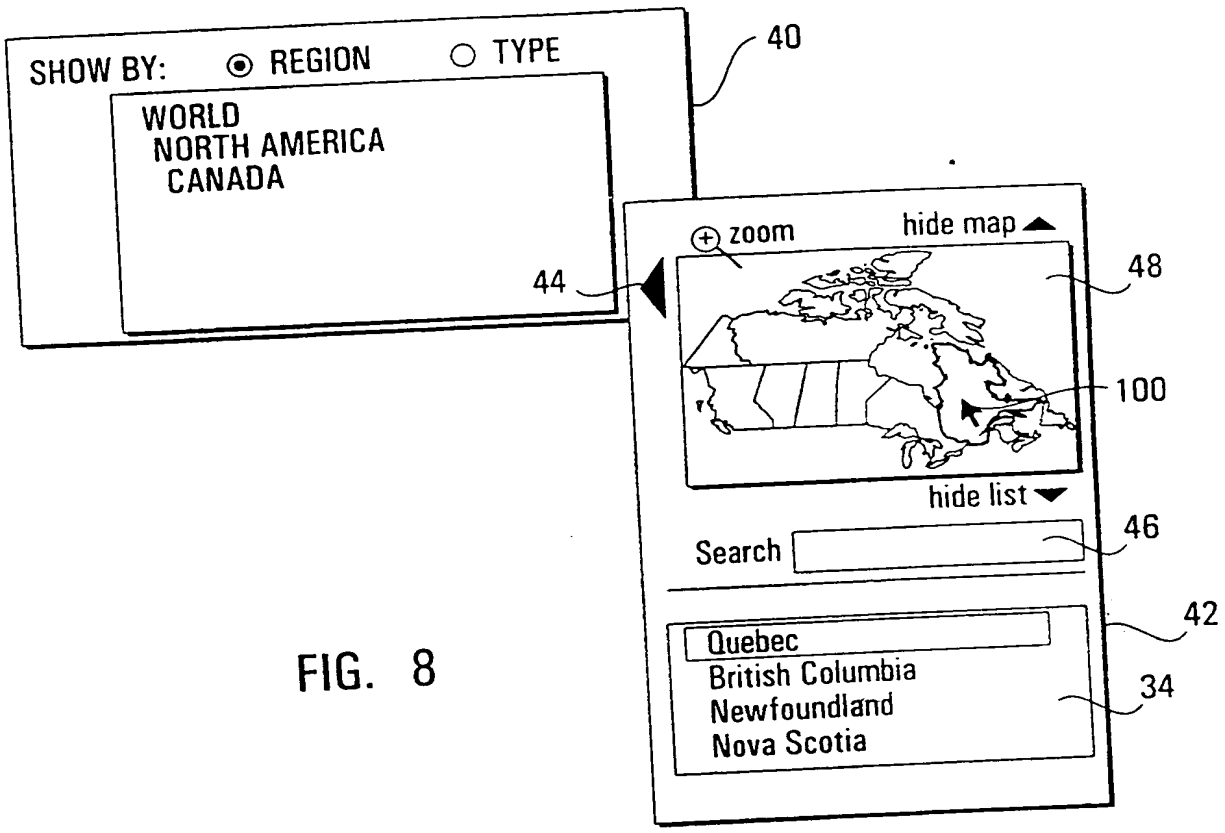

SHOW BY:
REGION
TYPE
WORLD
NORTH AMERICA
CANADA
40
44
zoom
hide map
48
100
hide list
Search
46
42
Quebec
British Columbia
Newfoundland
Nova Scotia
34

FIG. 8

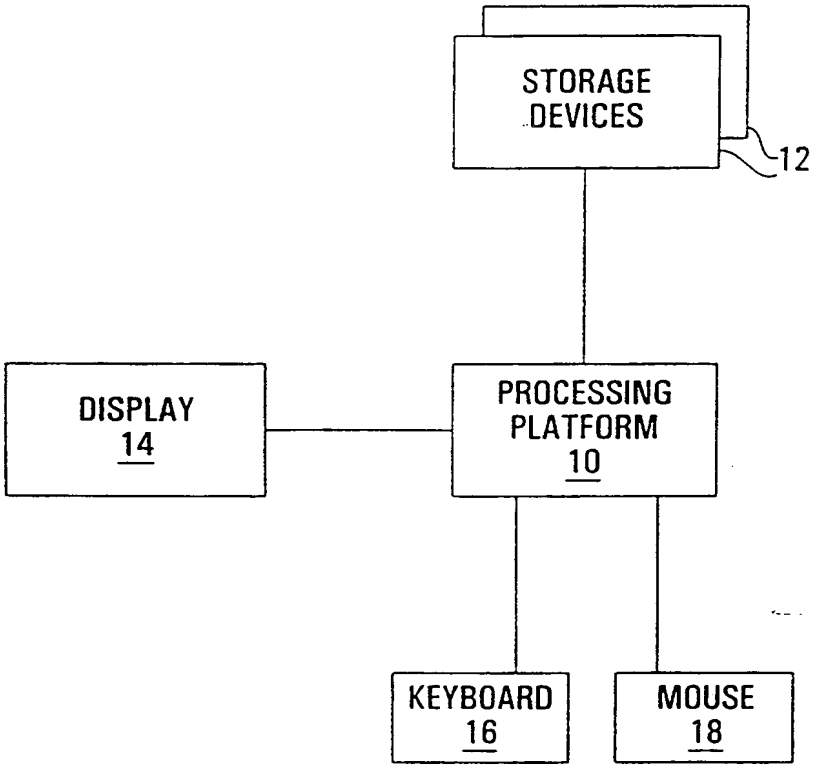

STORAGE DEVICES
12
DISPLAY 14
PROCESSING PLATFORM 10
KEYBOARD 16
MOUSE 18

FIG. 9

INTERNATIONAL SEARCH REPORT

Interna tl Application No
PCT/CA 00/00596

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G06F3/033

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, PAJ, WPI Data, IBM-TDB

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 065 347 A (PAJAK HENRY G ET AL) 12 November 1991 (1991-11-12) the whole document ---	1,2,4-9, 11-14, 17,18, 20-25,27
X	US 5 838 319 A (GUZAK CHRISTOPHER J ET AL) 17 November 1998 (1998-11-17) abstract column 1, line 1 -column 8, last line; figures 1-11 ---	1-5,8,9, 11,13, 14,17,18 19-27
A	-/--	

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
3 November 2000	10/11/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Davenport, K

1

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Interna tl Application No
PCT/CA 00/00596

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 714 971 A (SHALIT ANDREW ET AL) 3 February 1998 (1998-02-03) abstract column 1, line 1 -column 10, line 8; figures 1-10	1-6,8,9, 11-14, 17-27
X	US 5 682 525 A (BOUVE W LINCOLN ET AL) 28 October 1997 (1997-10-28) abstract column 1, line 1 -column 3, line 57 column 7, line 1 -column 8, line 27; figures 3A-3C,4,4A	1,8-10
A	US 4 710 763 A (FRANKE DAVID W ET AL) 1 December 1987 (1987-12-01) abstract column 1, line 1 -column 3, line 20; figures 3A-3E	1,8,13, 15-27

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

Intern: al Application No
PCT/CA 00/00596

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5065347 A	12-11-1991	NONE	
US 5838319 A	17-11-1998	US 5977971 A	02-11-1999
US 5714971 A	03-02-1998	AU 6707394 A	08-11-1994
		CA 2161023 A	27-10-1994
		EP 0695448 A	07-02-1996
		JP 8509311 T	01-10-1996
		WO 9424657 A	27-10-1994
US 5682525 A	28-10-1997	US 6085177 A	04-07-2000
US 4710763 A	01-12-1987	JP 2077965 C	09-08-1996
		JP 7086819 B	20-09-1995
		JP 61221830 A	02-10-1986

Best Available Copy